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# THE AGRICULTURAL STUDENT



INDUSTRIAL ALCOHOL—O. M. JOHNSON.

MONCLOVA TOWNSHIP HIGH SCHOOL—A. B.  
GRAHAM.

CONVENIENCE IN THE COUNTRY HOME—E.  
KINNEY.

HISTORY OF PUBLIC LANDS OF OHIO—J. H.  
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VALUE OF VARIETY TESTS—O. J. B. SMITH.

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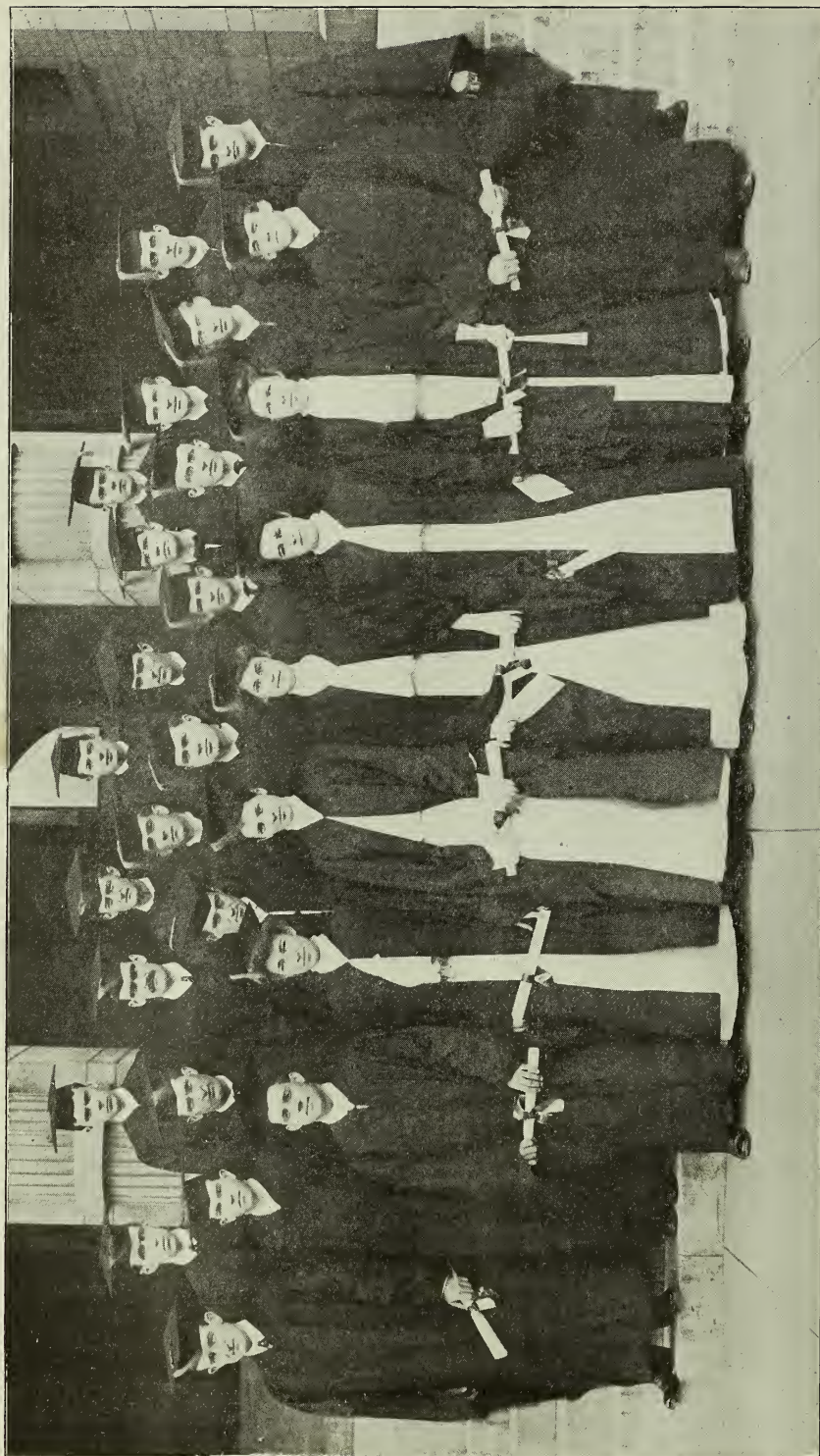
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CLASS OF '06—COLLEGE OF AGRICULTURE AND DOMESTIC SCIENCE

# THE AGRICULTURAL STUDENT.

VOL. XIII. OHIO STATE UNIVERSITY, COLUMBUS, DECEMBER, 1906 No. 3

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## EDITORIAL NOTES

The plan of conducting the farmers' institute work in Ohio by Secretary Calvert seems to be a commendable one. Not only has the number of institute speakers been increased, but attention has been given to procuring institute workers from out of the state who are prepared on special subjects of unusual interest to the farmers.

In this age when the agricultural press has flooded the country with farm and college bulletins, agricultural magazines and such, it seems that the farmer has equal advantages of reinforcing himself for an agricultural education as the ordinary institute speaker. It has been stated by some that the standard of the farmers' education has made greater advancements than that of the institute speaker. Therefore it behooves the latter to adopt a means by which he can advance relatively as fast as the farmer. It has been suggested that a course be planned by the Agricultural College for the purpose of better preparing the institute speakers to follow their work. Again, it would seem profitable to all if the speakers could have a round-up for a



week at Columbus, before the institute season, to discuss plans and post themselves with sufficient information to better conduct an institute. The real success of an institute does not consist in a good speech alone, but largely the interest taken in the discussion of the people present. The speaker that can place his argument in a clear, concise manner to awaken the greatest interest is the winner.

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In view of the fact that the next meeting of the American Breeders' Association will be held at the State University in conjunction with the various agricultural organizations of the state, we are giving in another column a condensed account of the organization and what it hopes to accomplish. The Association will be the guest of the University and the State Board of Agriculture and will hold joint sessions with the State Farmers' Institute, State Board of Agriculture and the State Horticultural Society during Agricultural Week, January 15-18, 1907. Work upon the program has progressed far enough to indicate that this will be the most brilliant and profitable series of agricultural meetings ever held in Columbus.

The University is cooperating with Secretary Calvert and the State Board and it is hoped that every alumnus and ex-student of the College of Agriculture will make an extra effort to be in attendance at these meetings.

In addition to the best local talent a large number of distinguished scientists from all parts of the country have been invited to be present and participate in the program.

### **The American Breeders' Association—All About It.**

**When:** It was organized at St. Louis, Mo., December 29-31, 1903.

**Where:** It holds meetings at any point in the United States which the members through the Council may choose. Correspondence should be addressed to the secretary, W. M. Hays, Washington, D. C.

**Why:** Its purpose is to find out the laws of breeding in animals and plants; to learn how to apply these principles in increasing the power of our five billion dollars' worth of agricultural crops and animals to yield larger values per acre and per herd; to further the efforts of private and public agencies which are working along these lines.

**How:** The practical breeders of plants and animals are joined with the investigators and experimenters in breeding and heredity in a large association. A large membership from all these interests representing a very wide experience with breeding problems affords the society a great mass of facts from which to seek out the principles of heredity, and also affords the means for broadly disseminating its work and for giving support to breeding interests.

A breeders' directory in the annual report shows the problems each member is working at, the improved animals and plants for sale by each breeder and the works published on breeding. It is proposed to make of this directory a dictionary of what is being done in breeding and who is doing it.

**Who:** The officers are Hon. James Wilson, president; Hon. L. H. Kerrick, vice president; Hon. W. M. Hays, secretary; Prof. Oscar Erf, treasurer; Hon. John Dryden, chairman Animal Section; Prof. F. B. Mumford, secretary Animal Section; Mr. Chas. Willis



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MISSOURI STATE FAIR, Sedalia, Mo., Sept. 29-Oct. 5, 1906

AMERICAN ROYAL LIVE STOCK SHOW, Kansas City, Mo., Oct. 8-13, 1906.

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**What:** Three enthusiastic meetings have been held, the first at St. Louis, Mo., December 29-31, 1903, and the second at Champaign, Ill., February 1-3, 1905, and the third at Lincoln, Neb., January 18-20, 1906. Its first report, Volume I, was published early in the year. Volume II, containing the most advanced thought on the subject of breeding and heredity, is now being delivered to the members.

**How Many:** It has built up a membership of about one thousand breeders and scientists. The membership should be several thousand. The objects of the association and expenses of its work make this necessary and the low fee places it within the reach of all.

**How Much:** The annual fee is \$1.00 for North America and \$2.00 for other countries. The life fee is \$20.00.

**What For:** The annual fees and the interest on the life fees are used in paying the cost of the annual report and contingent expenses. The life fees are permanently invested and cannot be lost to the life members.

The only way to get the annual report, to be in the directory, to help and be helped, is to become a member by sending \$1.00—or \$20.00—to the secretary.

The next meeting will be at the Ohio State University, Columbus, Ohio, January 15, 16, 17 and 18, 1907.

### **Agricultural Special Train.**

Iowa has been noted for her famous "Corn Train," but Ohio is planning what we expect to be a scheme of greater importance to agricultural interests.

Through the cooperation of the Experiment Station and the Agricultural College there is an agricultural special train anticipated to run north over the Cincinnati Northern Railroad through the western tier of counties of Ohio during the week of the holidays.

This train will carry a force of instructors and speakers of eight or ten in number. The train will consist of a corn and alfalfa car, carrying produce, and of a live stock car consisting of a good exhibit. The party expect to spend about one hour at each station in their demonstrations.

This plan is heartily endorsed by the railroad which asked that such may be carried out.

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### **Industrial Alcohol.**

At present the question as to a cheap and convenient source of fuel, energy and light is one which occupies the minds of many people. Alcohol has long been used for fuel and power to a limited extent, but wood alcohol is expensive, while ethyl alcohol is made expensive by tax. The desire of people for a cheap industrial alcohol led to the enactment of a law during the last session of Congress whereby alcohol unfit for drinking can be used without taxation. The terms industrial and denatured are identical in this article.

The law still keeps the manufacture of alcohol under government control but provides that alcohol for industrial purposes may be withdrawn from bond without tax. The control in manufacture is in the Internal Revenue Department. However, the Department of

Agriculture has conducted investigations concerning the manufacture of a cheap ethyl alcohol and means by which it can be denatured. The results are published in Farmers' Bulletins No. 268 and No. 269, from which this is largely taken.

The process of denaturing has been defined as any means of rendering alcohol unsuitable for drinking by adding a substance soluble therein of bad taste or odor, or both, to such an extent as to make it impossible to use it for drinking purpose.

Of course, there are some inebriates so low that they will drink anything containing alcohol, no matter how ill-smelling or poisonous it may be; but the number is small and will not materially affect revenues.

The substances which are used for denaturing are various and depend on the use to which the alcohol is to be put.

The formula which has been authorized by the Commissioner of Internal Revenue is: To 100 parts of ethyl alcohol by volume add 10 per cent. of approved methyl (wood) alcohol and one-half of one part of benzene. Special formulas are permitted by the commissioner for some industries. The law also requires that not less than 300 gallons be withdrawn at once for denaturing.

The farmer is little concerned about the processes of manufacture or denaturing but is concerned about the crops which will furnish raw material and the effect that the manufacture of alcohol on a large scale will have on prices. Its use as a source of heat and light is also of interest to him.

The raw materials are such crops as contain sugars, starch, gums and cellulose, all of which may be converted into fermentable sugars. Sugars which fer-

ment are easily changed into alcohol by the action of the yeast plant in not too concentrated solutions. During the process two molecules of alcohol and one molecule of carbon dioxide are formed from a molecule of sugar.

Starch is converted into fermentable sugar by action of dilute acids or an enzyme called diastase. The latter is generally used.

Cellulose is changed into sugar by the action of acids but this sugar is mostly in a non-fermentable form. Improvements are being made in the process but as yet cellulose is little used.

The gums are used only as they occur in connection with starches and sugars when they are partially converted into sugars.

The plants yielding starch are potatoes, sweet potatoes, cereals and cassava. Rice has highest per cent. of starch, while oats is lowest. The potato grown especially for its starch may contain 20 per cent., while cassava contains 20 to 30 per cent.

The sugar-producing plants include sugar-cane, which contain 9 to 14 per cent. sugar in this country, it being somewhat higher in tropical countries; sugar beets, the juice of which contains 12 to 18 per cent., and sorghum, which contains 7 to 15 per cent. Sorghum seed can also be used. Corn stalks contain 3 to 8 per cent., which may be increased by action of acids.

These are some of the general statements concerning sources of fermentable material which will now be considered more in detail.

Artichokes have been suggested as a source since they will yield well and contain 16 to 17 per cent. of fermentable material. At present this crop is not much grown in this country, but since it is so easily stored it would be



especially valuable during slack periods of other materials.

Barley would never furnish a cheap source of alcohol although it can easily be used for this purpose. The use of barley for preparation of malt is important since an enzyme called diastase in the malt has the power to change starch to fermentable sugar. This fact is the basis of all the manufacture of alcohol from starch. The increased demand which would be brought about by the use of large quantities of barley in making industrial alcohol is of considerable consequence.

Cassava, which is grown in the Southern states, promises to be valuable for alcohol manufacture. The moist root contains as high as 35 per cent. fermentable matter. Extravagant statements as to possible yields of this root have been made but an average may be taken as about four tons which would yield 143 gallons of 95 per cent. alcohol. On account of the rather high sugar content, and there being four or five per cent. lost in preparation of starch, it would seem probable that cassava might be more profitable for making alcohol than starch for in alcohol making the sugar is not lost.

In America corn is the largest source of ethyl alcohol. It is estimated that alcohol from corn at present prices will cost about 40 cents per gallon. This counts the raw material for each gallon worth 15 cents with as much more for cost of manufacture and 10 cents for profit and cost of retailing. Each bushel of corn can be made to yield 2.7 gallons of alcohol.

The potato is the chief source of alcohol in Germany. The ordinary table varieties are not used but instead varieties yielding more and having a higher starch content.

In America potatoes usually contain

15 to 16 per cent. starch while in Germany the kind used for alcohol contains 20 per cent. The average yield of potatoes in United States during 1905 was 87 bushels per acre which would yield 75 gallons commercial alcohol. Corn taken at the average yield would make about 77 gallons per acre.

Rice contains the highest per cent. of fermentable material, about 75 per cent. At present, rice would not furnish an economical source of commercial alcohol, although wastes in the form of broken grains might be used.

Who utilizes all his by-products in order to make his business profitable? This year there was a surplus of apples suitable for making alcohol in some sections of Ohio. Cider vinegar has been largely replaced by dilute acetic acid while the demand for sweet cider is limited. If a distillery could use such products they might be made quite a source of revenue to the farmer.

The refuse from canning factories, especially where corn and tomatoes are used, affords a good source for by-products.

The corn cob contains considerable sugar which may be increased by treating the whole mass with acid which changes cellulose and starch to sugar. Tomato parings and pea hulls may also be used.

The molasses from sugar factories and refineries may also be used. In France during the past year 13,500,000 gallons of alcohol were produced from beet sugar molasses. Stalks from corn and sorghum may be used but the chief objection is that the period during which they are available is short and other substances must be used in order to keep the distillery going.

Sugar beets are used extensively in France for making industrial alcohol. Sweet potatoes contain a large amount

of starch as well as 5 to 6 per cent. sugar all of which is fermentable. In the southern states they may be profitably used for making alcohol.

This gives a brief discussion of the staple sources of alcohol. At present, authorities are pretty well agreed that the manufacture of alcohol will have little influence on prices of staple crops; but in the case of a surplus such as we had some years ago in corn, alcohol would no doubt furnish a profitable outlet for crops.

Alcohol manufacture would not be detrimental to the soil if the by-products were returned to the soil since alcohol is wholly composed of carbon, hydrogen and oxygen, all of which are obtained from air and water thus not decreasing soil fertility.

The great advantage of tax-free industrial alcohol lies in the fact that many by-products which would otherwise be wasted may be used in this way.

The farmer must learn a lesson from the manufacturer.

There seems no possibility that small stills will be erected on farms to utilize waste products since a government officer must look after the plant and the larger distilleries can be run more economically. The uses to which industrial alcohol can be put are varied. It is an ideal fuel producing a great deal of heat and no disagreeable gases. It can be used in lamps if a mantle is added.

It is a good source of energy in engines. The ordinary gas engine needs but little modification in order to use it. The principal change is in the explosion chamber which is due to the fact that alcohol vaporizes at 158 to 175 degrees F., while gasoline is volatile at 98.5 degrees F. Since alcohol volatilizes less readily than gasoline it would be safer to store.

Alcohol is used as a starting point in

making a number of other compounds. In this way large quantities of denatured alcohol will no doubt be used.

The production of industrial alcohol in other countries is of some interest. In Germany during the year 1904 to 1905, about 40,000,000 gallons were used. The retail price of 95 per cent. alcohol was about 30 cents per gallon, while gasoline retailed for 20 cents and kerosene for 18 cents per gallon.

In France during the year 1905 about 12,500,000 gallons were used at a retail price of 40 cents.

The possibilities for this product are great, but there will be many disappointments to agricultural interests. Many reports concerning yield to be obtained are extravagant or false and will necessarily delude many. New and profitable sources and processes for manufacture will be found. The industry is one which will no doubt grow but at present we must go slowly until further experiments are tried.

O. M. Johnson.

#### **FAR AWAY AUSTRALIA.**

##### **An Australian School—Boys' Letter to an Ohio Boy.**

"Richmond, New South Wales,

"September 14, 1906.

"The farmers are putting in their summer crops now. The chief crops grown here are potatoes, pumpkins, maise, wheat, etc.

"The pupils of our school have been granted a piece of land by the government. The land is five acres in area. The boys and girls of the school go to the farm every Monday and Thursday at 3 o'clock to learn a little about agriculture. The land is divided into plots, each plot being forty feet by twelve feet.

"We have been very busy the past two weeks putting in our summer crops.

"If you study agriculture at the school you go to, I would like you to

tell me something about it and your school garden.

"All the schools around Richmond will have an exhibition on the twenty-fourth of November. It will be the first of its kind ever held in New South Wales. When it comes off I will write and tell you what it is like. It is going to be held in the school of arts, which is next to our school.

"The Premier of New South Wales is going to open the exhibition and we expect to see three or four hundred children present.

"Your friend,  
"Frank Bennett."

When one is reminded of the fact that all that remains of the Malay tribes in Australia would not make a city as large as Springfield or Youngstown, O., there is no surprise to find that the language, customs, etc., are English and that the Australian colonies are adopting modern methods and means in its schools. Transporting children to school in Australia has been tried about as long as in Ohio. Their school texts

and course of study are such as Ohio school officials might get valuable suggestions from.

The writer only wishes that a facsimile of the letter might be produced on this page. Those who are interested in penmanship might find something to think about.

A. B. G.

On November 24, the Blendon Agricultural Township Club of Franklin County held an exhibition at Worthington. Professors Decker and McCall attended and made short talks.

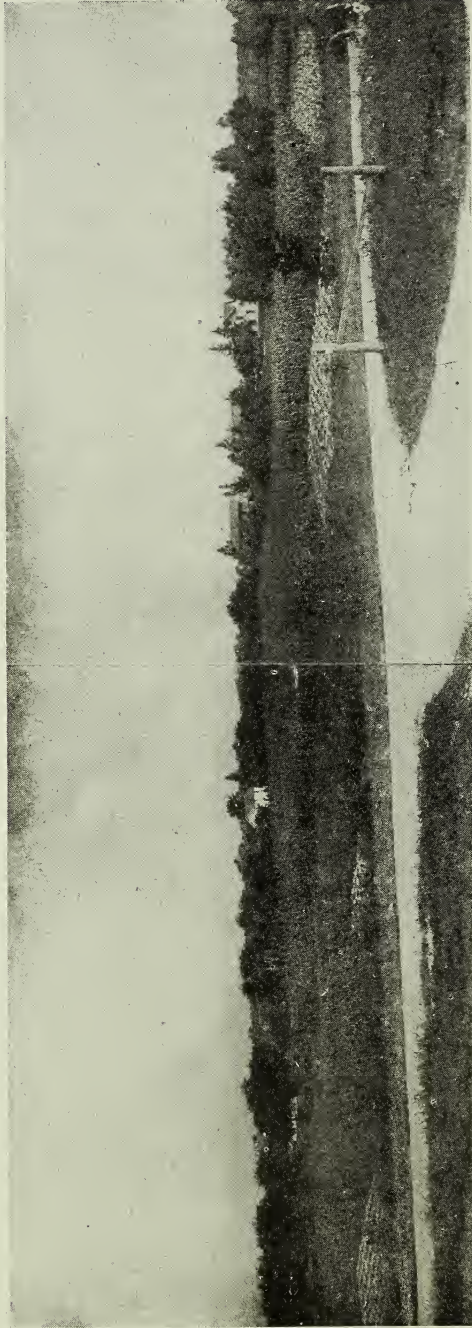
The township school at Thackeray, O., has not only added agricultural science to its course, but has bought a set of carpenter tools for use in the school.

At present there are over thirty township high schools which have agricultural science connected with their regular course.



MONCLOVA TOWNSHIP HIGH SCHOOL





MONCLOVA TOWNSHIP HIGH SCHOOL GARDEN

### **The Monclova Township High School**

A. B. GRAHAM.

Twenty-five minutes ride from Toledo brings one to the little village of Monclova on the Wabash railroad. This little village of about a hundred and fifty people appears to be about the same as many other railway stations of its size. For the farmer of Monclova township it has been a trading and shipping point for many years. In one particular it may differ from others.

At this place the township board of education during the past two years has been offering the kind of school course in its township high school that will better prepare the boys and girls who desire to remain on the farm. The course is not of that kind that is so extremely practical that it has nothing beyond the practical to offer. Utility has not been forgotten, however.

Every one who has studied algebra and geometry under a real teacher knows that even though every proposition and theorem has been forgotten, the effect upon the mind resembles the effect upon a knife that has been well whetted. The study of Latin or a modern language prepares one to make a more exact use of one's own tongue. The study of English equips one with the best that has been written or sung. The Latin or other language may be forgotten but its results are apparent in the better use of English. The study of the sciences prepares the student to practice his chosen art more definitely.

In the high school studies such as physical geography, botany and physics there are many subjects that offer an opportunity to refer the farm boy and girl to their own environment for illustration. Said formation, the effects of climate on soils, drainage, plant and animal distribution, etc., should be pre-

sented in such a manner that they mean more to those who may practice the art of farming; capillary water in the soil, the effects of heat and light upon the soils of different colors, the loss of heat by radiation, evaporation and conduction, centrifugal force as exemplified in the cream separator and milk tester, may make the study of physics mean more to farmers' children; conditions under which the cereals sprout and grow, self or cross pollination of farm plants, the economic value of weeds, the making of grafts and the setting of buds, the points of excellence in the common cereals, etc., brings the study of botany into closer touch with the farm.

Work similar to what has already been described is being carried on in the township high school at Monclova.

The library contains besides literary selections, many of the best Farmers' Bulletins published by the Agricultural Department at Washington, D. C., and a few of the best elementary books on agriculture and nature. Common business papers, forms and accounts are made a part of the instruction. This is not offered as a full business course but enough is given to acquaint the boys and girls with some of the business practices of today.

What is done within the walls of the school room shows that Mr. H. M. Lehr and the school board of that township are quite considerate of the needs of the many children who will end their school days at Monclova township high school. But the theoretical in agricultural education is not all that this school has to offer.

The Boys' and Girls' Agricultural Club has been formed and some planting of flowers, etc., has been done on the ground and corn and vegetables have been planted at home. To be sure



some have not kept carefully prepared records but the little that has been done to observe is a step in the right direction.

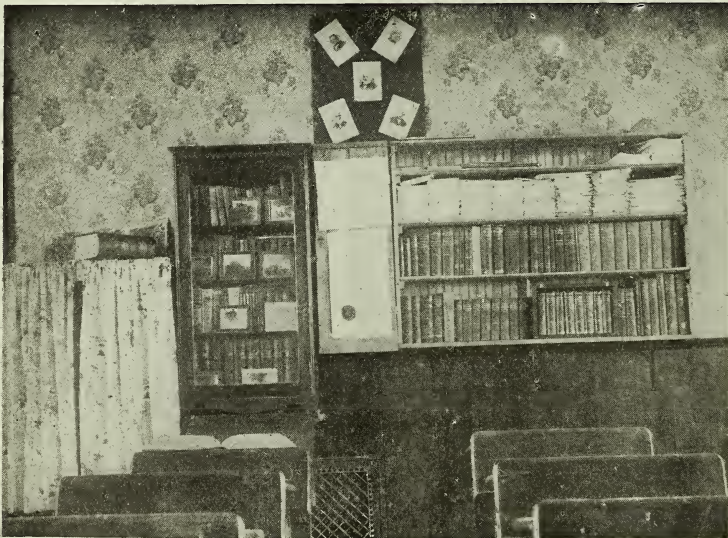
Across the road from the school building is a plot of two and one-half acres of sandy ground such as is commonly found in that part of Lucas county. This has been rented for experimental purposes by the board of education. Late last spring this plot was planted with corn, potatoes, cabbage, soy-beans, etc., for use in study rather than to determine best varieties.

While Supt. Lehr has not yet succeeded in reaping all the benefits that shall come from such an experiment, it is one of the best planned attempts at giving both theoretical and practical work in agriculture so far offered in Ohio.

The writer shall never forget what was perhaps an unguarded remark made by a lady who assured him that

the corn, etc., that he stood before was, "The Monclova Township High School Experiment Garden"; "I don't see anything so grand about that." The lady may have said what would voice the opinion of thousands who are looking for those things that strike us with amazement. Is it grandeur that we are seeking in our schools? If so look well to some mammoth school buildings and smooth glass and brass mounted apparatus. If we are seeking to know about those things which may be of practical value and use for the many, look well to the simple and comparatively inexpensive things such as one can find in this school building and on and near this school ground.

Why not have our elementary and high schools more completely serve people who support them without losing any good results that have come from them in the past?



MONCLOVA TOWNSHIP HIGH SCHOOL LIBRARY



### Why the Stockman Needs Reciprocity

The United States last year produced a crop of corn which exceeded two and one-half billion bushels. Another bumper yield is here which is expected to reach two and three-quarter billion. Such conditions produce prosperity in Wall street, at Pittsburg and elsewhere in direct proportion to the profit acquired by the farmer. All agricultural economists agree that the large corn crop should be fed out upon the farms upon which it is produced instead of being hauled to market as grain. Stock feeding enriches and builds up the farm, whereas grain selling is soil robbing.

Stock feeding means meat making. No other nation can produce corn in such large quantities; no other country can produce such enormous quantities of meat because there is no economical equivalent for corn in the production of high class meats. No country is as free from animal disease, and, as great as our present feed-lot output is, the productive capacity of our farms and ranches is much greater. The question then arises, where are we to market our surplus meats produced upon the corn and grasses of the west, and it is one that must have consideration. The American buyers want steak, but unfortunately the farmers and ranchmen can not breed and grow cattle that are all ribs and loin. There are necks, shoulders, flanks, rumps, thighs and shanks that must be disposed of at a sacrifice. Both the French and Germans, under fair reciprocal relations would take large quantities of this very class of product that is most difficult to handle here at home.

Under the head of salted and barreled beef and canned meats, we are to lose under the new German tariff schedules a large and important business which

affect especially the profitable marketing of cattle from western ranges.

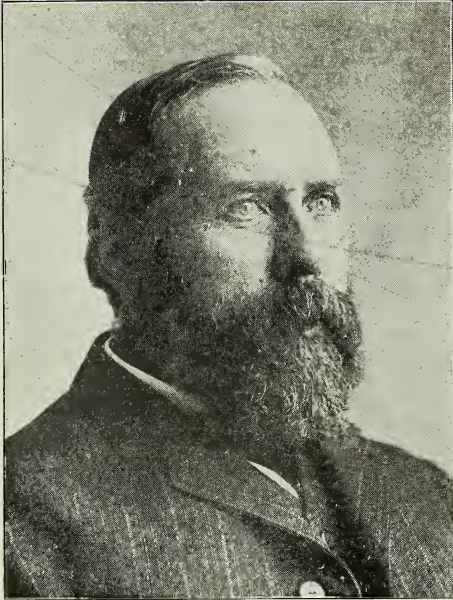
Our trade along this line has dropped off one-half since 1909 and tariff regulations which will practically exclude our products going into effect in 1907 means no market in Germany, and with France already cut off we shall need to run the world over to find a market for this class of meat.

We know that the consumers of continental Europe are clamoring for meat. We know that they could utilize millions of pounds of the lower priced grades and cuts, the lack of demand for which at home constitutes the heaviest single drag upon our stock markets, and yet we are denied admission to their ports.

That the German frontiers will be opened to admit increased supplies in the not distant future is reasonably certain. That the farmers of the United States will be given a chance on the Hamburg and Bremen docks does not necessarily follow. Germany is pursuing a consistent reciprocity policy; and when she opens her doors to admit foreign grains and provisions it will be found that she has done so only through the negotiation of commercial agreements, such as she desires to enter into with this country. If she can not deal with us she will buy her bread and meat elsewhere. That is all there is to it.

What is bound to happen in such a case? What must result when seventy-five per cent. of the domestic demand concentrates upon twenty-five per cent. of the carcass? What is to be done? An urgent effort must be put forth in order to bring our western producers and the European consumers together. Our Congressmen and Senators must be interested in this matter. Now is the time to talk to them.

"WOODBERRY."



DAVID FYFFE,

Live Stock Superintendent at O. S. U.

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**Conveniences in the Country Home.**

During the last few years the advent of the rural mail delivery and the extensions of telephone service to almost all parts of the country districts have been great factors in making rural life more attractive. The man who dislikes the isolation which his remoteness from town and distance from neighbors made necessary, has accepted these two improvements as a great boon. With his daily paper to keep him posted upon affairs of the world and his telephone on affairs of his neighbors the farmer should be pretty well contented. Yet one luxury calls for another and what were luxuries yesterday become necessities today. So with the telephone and daily paper. The farmer has come to regard them as actual necessities and is looking around for other things which may help to make his life more pleasurable and his home more comfortable and attractive.

The farmer can, with careful planning and a small outlay of money, make his home almost as convenient and comfortable as the city man. True, there are a few things which cannot be had as easily in the city, and would cost too much for the farmer in moderate circumstances. However, there are substitutes which can be employed with almost equally satisfactory results.

To begin with, the water supply for the house. The water is usually obtained from a well and a cistern. The pump for the cistern is sometimes inside the house but more often outside. The pump to the well is almost invariably right where the well is located. This occasions many needless steps, for it is just as easy to have both pumps in the house as to have them directly over the well and cistern. Underground pipes leading from the supply of water to the kitchen may be laid and the pumps located by the sink. The pumping will be practically as easy and it is certainly more convenient. The only precaution necessary is to lay the pipes below the frost line and protect them where they enter the house.

The bath room can be supplied in the same way by a pipe leading from the cistern and a pump so located that water can be pumped directly into the bath tub. By using one of the instantaneous water heaters now on the market and which use gasoline as a fuel, hot water can be had at any time. For this the pump used should be a force pump, and a small tank placed above the heater into which the water can be forced, so it can flow down through the heater. If any home is without a bath room furnished with an adequate supply of hot and cold water, the family is certainly missing one of the greatest comforts that civilized life affords. Modifications of the above plans can of



course be adopted. Where the farmer has a windpump over the well a tank can be located in the kitchen and the water forced into it by the windpump. However, it is not possible to have as fresh and cold water by this plan as by the other. The writer knows from experience that few country homes have as convenient water supply as this system would give, and believes it to be due largely to the fact that the owners do not appreciate how easily and cheaply it can be had.

The man who wishes a more elaborate system and has more money to spend can have his house plumbed and arrange some method of having a supply of water under pressure. A simple plan in a house high enough is to locate tanks in the attic, and pump the water into these from the cistern and well by means of a windpump or gasoline engine. Or a water tower may be built with a windpump on top and a tank; but this is hard to protect from freezing in winter. Another plan is to have air tight tanks located in the basement or under ground. Into these the water is pumped until the air pressure is sufficient to elevate the water to the desired height. This is a new plan and is said to work well. The advantages are, possibilities of good pressure, protection from frost, and cool water.

In case of a system of waterworks such as described above some method of disposing of the sewerage must be devised. A plan used quite extensively is to locate a large bottomless cistern at some point where there is no danger of drainage back to the well and have the sewerage empty into this. The solid material can be removed every five years and the liquid portion will drain away into the soil. The amount of sewerage from one house being small the outlet can be on land of a lower level and the sewerage allowed to flow

directly on the land. A trap is placed near the outlet to catch the solid material and this is cleaned out occasionally. For the man who is contemplating building a complete system it would be a good idea to visit some of the suburban homes near large cities, where many such systems are in use and determine which is best suited for his purpose.

The question of heating is one easily settled and many farmers have settled it already. It is as easy to install a furnace or hot water system in a country home as in a city home, and the cost of fuel is perhaps less, especially where there is timber on the farm. A furnace is more economical of fuel than stoves, and much more convenient and satisfactory. No dirty stoves in the rooms, only one fire to keep up and the whole house warm. A furnace will pay for itself in economy of fuel and added comfort in a very few years. It isn't a question of affording one, but a question as to whether you can afford to do without one. A furnace is more healthful, too. The temperature of the house can be kept more even and better ventilation is assured. It relieves the tendency for the whole family to stay in one hot, close room and allows the use of the whole house in winter.

Another convenience that will greatly add to the appearance of the home and to its accessibility in bad weather is a few convenient walks around the house. They do not cost much if the farmer puts them in himself during slack time. The gravel and sand can be secured and hauled for a small sum and practically the only direct cost is the cement. Almost any one can make a good appearing and lasting walk with proper care and, as said above, they add greatly to the appearance of the home and also help to keep dirt and mud from being tracked into the house.

These suggestions for making a comfortable home are not intended to be exhaustive and cover only some of the more important things. To the thoughtful man many minor improvements will suggest themselves and carrying them out will be a pleasure.

E. K.



**Ohio Experiment Station Notes—State  
Board of Agriculture—At Other  
Stations.**

A recent circular from the Ohio Station gives the names of those members of the station staff who have prepared addresses to be given at various farmers' institutes. This is a very attractive circular and we wish that we might have an opportunity to listen to every man upon his various subjects. The following is a sample list: Some Ohio Rotations, by C. G. Williams; Bad Seeds and Weeds, by A. D. Selby; Insects of Live Stock, by H. A. Gossard; Better Live Stock for the Farm, by B. E. Carmichael; The Codling Moth, by J. S. Houser, How Plants Get Their Food From the Soil, by J. M. Van Hook; Potato Culture, by C. W. Waid; Beautifying the Home Grounds, by F. H. Ballow; The Culture of Alfalfa, by C. H. Kyle, and The Farm Woodlot, by Edmund Secrist.

Press Bulletin No. 282 of the station reports briefly the results of fertilizing wheat on land where a three-year rotation of potatoes, wheat and clover has been followed. The average yield of wheat on the unfertilized plots for the last ten years has been twenty-five bushels per acre. An application of 160 pounds of acid phosphate per acre to the wheat, following a like application to the potatoes, has increased the wheat yield five bushels per acre. When 100 pounds of muriate of potash was added for each crop, the yield was increased by seven bushels, while a complete fertilizer of 160 pounds of acid of phosphate, 100 pounds muriate of potash and the equivalent of 160 pounds of nitrate of soda for each crop has increased the yield more than fifteen bushels per acre on a ten year average. The increase in the potato yield has more than paid for the com-

mercial fertilizer used. And not only this but the annual yield seems to be increasing. For the first five years of the time the average was thirty-eight and one-quarter bushels per acre, while for the last half of the ten-year period it is forty-two and one-half bushels.

Prof Greene reports that the figures showing the growth made by the chestnut are very convincing. As a farm crop upon the sandy hills of the state, it is very promising. We hope that it may be proven that the twenty-five per cent. of our state that is covered with declining forests or useless bushes can be made to be a source of profit. A number of experiments are going to be started at various points in the state, one being at Lancaster, which will show what can be done in the way of tree growing for commercial purposes.

The latest official report from the Ohio Department of Agriculture gives some very interesting figures as to yields of various farm crops in this state during the past season. There were 2,044,981 acres of wheat harvested, and the average yield per acre estimated from threshers returns was 20.9 bushels. This is above the average, the nearest approach to it being made in 1894, when it was eighteen bushels. The quality of the grain for this season was 97 per cent., which is more than usual.

The oats crop was not quite as good as usual, conditions being unfavorable at planting and harvesting time. The average yield is given as 339 bushels per acre.

The corn prospect is exceedingly good and as compared with other years is 104 per cent. The amount of corn cut up for fodder was 86 per cent., and the average date of cutting for the state was September 16.

The potato yield as compared with

the average was only 84 per cent., and the prospect for apples only 71 per cent.

We were very much pleased with Bulletin 72 of Missouri Experiment Station, on Alfalfa Growing in Missouri. Many of the readers will remember M. F. Miller, our late professor of agronomy, who is the author. Among his conclusions which can undoubtedly be applied in this state are the following: "Liberal manuring is the key to successful alfalfa culture on the uplands of the state. A knowledge of the peculiarities of the plant will ultimately make it possible to extend its culture to most soil types of the state. Alfalfa is not adapted to soils that are sour, liming, manuring or drainage being necessary to prepare such soils for the crop."

Bulletin 240 of the Michigan station reports the results obtained with "Roots Supplementary to Silage for Dairy Cows." They conclude that the addition of roots to an already complete ration stimulates both milk and butter fat production. But the cost per pound of butter fat was raised; in case a high record is to be made, however, roots might be used to advantage.

Stowe.

### **History of the Public Lands of Ohio and the Methods of Their Subdivision.**

In order to get a history of our state it is necessary to start with the discovery of America by Columbus.

After the discovery of the Western Continent the three strongest nations of Europe became rivals in exploring and colonizing the new land. Since the Spaniards confined their efforts in a vain attempt to find gold in South America and only as far north as Mexico, the history of their work does not affect our subject.

In the first half of the seventeenth century the English made several settlements along the Atlantic coast. The charters given to these colonies gave them control of so much shore line and extending back into the interior an indefinite distance, because the width of the continent was not known. The grant to Virginia entitled them to all the shore two hundred miles each way from Point Comfort, extending across the continent and included all islands within one hundred miles of either shore.

Meanwhile the French had settled Canada and through the exploration of La Salle and Marquette they acquired a claim on all the territory in the Mississippi valley. Each tried in a way to hold the territory west of the Alleghanies and the controversy was finally settled by the Treaty of Paris in 1763. By this treaty England received all territory east of the Mississippi river and all of the Dominion of Canada, leaving territory called Louisiana to Spain. Afterward it was ceded by Spain to France. England held her territory until the end of the Revolutionary war when it became the property of the colonies.

At the suggestion of the Continental Congress it was ceded by the several states to the General Government, although some of the states were slow in doing so. Reservations were made by Virginia and Connecticut. Virginia ceded all the land north of the Ohio to the National Government, but if it should be found that the possessions south of the Ohio river should prove inadequate to fulfill the promises to Revolutionary soldiers, they should have the desired amount from that north of the Ohio between Scoto and Miami rivers. That reserved by Connecticut lies in Northeastern Ohio.

The first public surveys were made

under the ordinance of 1785, which provided for townships six miles square by lines running due north from the Ohio river. The district comprising this survey is that lying west of the Pennsylvania line and is called "The Seven Ranges."

The boundaries of The Seven Ranges are as follows: Commencing at a point on the Ohio river due north from the extremity of Mason and Dixon's line and runs due west forty-two miles, thence south to the Ohio. Ranges were six miles wide numbered westward and these were subdivided by lines running east and west, into townships. Fractional townships were counted as whole townships in numbering. Each township was divided into sections numbered as in the diagram shown.

Range 4.

36	30	24	18	12	6
35					5
34					4
33					3
32					2
31	25	19	13	7	1

The first settlement in the state was on the land known as the Ohio Company's Purchase. This town was called Marietta and was located near Ft. Harmar for protection. The agents for this company contracted for 1,500,000 acres but only 964,285 acres were paid for.

This purchase had for its southern

boundary the Ohio river from the point where the west boundary of the Seven Ranges touch the Ohio, to a point eight ranges west or the west boundary of the fifteenth range, thence north to the boundary of seventh township, thence west one town, thence north six towns to the north boundary of the thirteenth township, thence east five towns, thence north one-half town, thence east to west boundary of the Seven Ranges, thence south to the starting point. The land was surveyed by the system of 1785.

Of each township Congress made the following reservations:

Section 16 for school purposes.

Section 29 for religious purposes.

Sections 8, 11 and 26 for future disposal by Congress, two townships of which form the main support of Ohio University at Athens.

Unfortunately for the members of the Ohio Company, the land selected by them is the most hilly and sterile tract of similar extent in the state.

The same method of township subdivision used in Seven Ranges was used in the Ohio Purchase.

The next tract sold by Congress was known as the Symmes Purchase, a tract of 311,682 acres, between the Great and Little Miami rivers. This land was patented in 1794 for 67 cents per acre. Congress reserved sections 16 and 29 for school and religious purposes, respectively.

A base line was run by the Government from one Miami river to the other. From this line meridian lines were run. From this point in the work the surveyors of the company finished the survey.

The ranges on the south which were not complete were called fractional ranges. In this survey the ranges extend east and west. The sections were



numbered the same as in the Ohio Company Purchase and in the Seven Ranges.

The reserved sections were sold by Symmes and later a township in Butler county was selected as College Township, which is the main support of Miami University at Oxford. In place of the school lands sold by Symmes a township in Warren county was given from the Congress Lands for this purpose.

The French Grant, a tract of 25,200 acres in Scoto county, was granted, in 1795, to a number of French families, who lost their lands by invalid titles.

The boundaries, commencing at a point one and one-half miles north of the Little Sandy, thence down the Ohio eight miles, when reduced to a straight line, thence at right angles from each extremity to include the amount granted.

United States Military Lands, also called Military Bounty Lands, are so called from the fact of their having been given by Congress to satisfy the claims of Revolutionary soldiers. They were paid in land according to rank, varying from 100 to 1100 acres.

Since the Greenville Treaty line is one of the boundaries of this tract it is best to give its history.

This treaty line is the result of the successful campaign against the Indians by General Wayne. By this treaty the boundary was defined as a line beginning at the mouth of Cuyahoga river and run thence up the same to the Portage, between that and the Tuscarawas branch of the Muckingum, thence down that branch to the crossing place above Fort Laurens, thence westerly to a fork of that branch of the Great Miami river running into the Ohio, at or near which stood Loromie's store, and whence commenced the Portage between the Miami of the Ohio and St.

Mary's river, which is a branch of the Miami which runs into Lake Erie; thence a westerly course to Fort Recovery, which stands on the branch of the Wabash; thence southerly in a direct line to the Ohio so as to intersect that river opposite the mouth of the Kentucky river.

The territory embracing the Military Bounty Land is as follows: Beginning at the northwest corner of the original Seven Ranges of townships, thence south fifty miles, thence west to the Scioto river, thence up said river to the Greenville treaty line, thence northeasterly with said line to old Fort Laurens, on the Tuscarawas, thence due east to the place of beginning, including about 2,560,000 acres of land.

These lands are surveyed into townships five miles square. These are again divided into quarter townships and further subdivided for the accommodation of those soldiers holding warrants for only 100 acres.

2	1
3	4

The quarter townships are numbered as in figure. The place of each township is ascertained by townships and ranges. Ranges running north and south numbered from east to west. The townships numbered from south to north. As no sections had been set aside for school purposes, the required amount was set aside from land unoccupied in 1803.

The Virginia Military Lands is a body of land lying between the Scioto and Little Miami rivers and reaching to the Ohio on the south. Virginia had found that in order to satisfy the soldiers' claims, she needed her Ohio reserve.

This district has for its boundaries the rivers just mentioned and for the rest of its western boundary a line known as the Ludlow line, from the

source of the Little Miami to the Indian Treaty line, thence westward along this line to the Roberts line, thence by this lines across the Lewistown reservoir to the source of the Scioto.

This section is not surveyed into townships of any regular form. Under the land laws of Virginia, a settler could locate his claim in any shape and in any part of the district he chose provided the land was unoccupied.

In 1852 Virginia released all her claims to the small patches which necessarily would be left under such a system of settlement and in 1871 Congress ceded these to the state and they were turned over to the trustees of the Ohio Agricultural and Mechanical College, now known as the Ohio State University. This cession amounted to 76,735 acres, appraised at \$14,287.

Connecticut Reserve lies in the north-eastern part of the state between Lake Erie on the north and the forty-first degree latitude line on the south, Pennsylvania on the east and extended west twenty-four townships or 120 miles, containing about 3,800,000 acres.

The five westernmost ranges of the Western Reserve are known as the Fire Lands from the fact that Connecticut gave as a donation to residents who had suffered a loss by fire during the Revolution.

The ranges are numbered from the Pennsylvania line and the townships are numbered north from the south boundary of the tract.

The Refugee Tract, about 100,000 acres, was granted to people who had left the British provinces and helped the colonies in their fight for freedom. It comprises a narrow strip, four and one-half miles wide from north to south and extends 48 miles to the east from the Scioto river. It consists of the northern fractional townships of ranges 16 to 23,

inclusive, lying just south of the United States Military Lands.

The rest of the state is Congress Land, so called because they were sold by officers of the general government.

The territory is surveyed into six mile townships. The townships are again subdivided into section by lines running parallel with the township and range lines.

In some parts of the Congress Lands the sections are numbered as in the Seven Ranges, while in other parts the present system is used.

Section 16 in every township is reserved for school purposes. The system of land subdivision in use at the present time was adopted by Congress in 1796. Only a few changes have been made since that time and these have been concerning division of sections.

At some conspicuous place in an unsurveyed territory an initial point should be established. Such a point should be in a place that could be easily identified and the point should be perpetuated by some indestructible monument, such as a copper bolt set in a rock ledge; and it should be witnessed by rock bearings. The necessary lines are extended from this point. They are classified as follows:

Class 1—Base lines and standard parallels.

Class 2—Principal and guide meridians.

Class 3—Township exteriors.

Class 4—Subdivision and meander lines.

The base line is extended from the initial point, on a true parallel of latitude, in either or both directions. There are two ways of determining this line, the secant and the tangent methods. The secant method has several advantages over the other and consists in starting from a point to the south of

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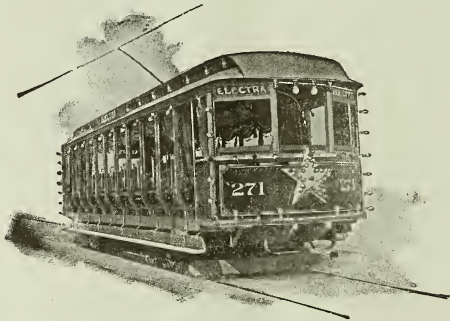
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the initial point by a definite amount and by turning off a definite angle and prolonging from that point, a straight line for six miles, then changing the direction of the secant line by a definite amount. At definite intervals according to location from turning point short distances are laid off on the prolonged line. The parallel passes through these points.

Proper township, section and quarter section corners are established, each in its proper place. To avoid error in this work two sets of chainmen are used.

The principal meridian is extended from the initial point either north or south, or in both directions and conforms to a true meridian.

Standard parallels, called corrections, are extended in either or both directions from the principal at regular intervals of twenty-four miles. They are run with the same care and in the same manner as the base line.

Guide meridians are extended north from the base line, or correction lines, at intervals of twenty-four miles east or west from the principal meridian and in the manner prescribed for the running of the principal meridian.

From points called township corners, true meridian lines are run dividing the twenty-four miles section into ranges six miles wide. Beginning with the southwestern township its boundary is run north from the standard parallel or base line, as the case may be. Cornerstones are set at proper places.

Next the latitudinal boundaries are run from east to west on random lines, and corrected back.

On the corrected lines, corners are established at required intervals commencing from the east throwing any excess or deficiency against the west boundary of the township. The townships are divided in following manner:

Beginning at the southeast corner a true meridian is determined. The first mile on the east and south boundaries are retraced. From the stone, on the south boundary, between sections 35 and 36 extends a line parallel with eastern boundary of the township, for a distance of one mile. This line will not be true north on account of the convergence of meridians. Set a quarter section mark forty chains from beginning point. At one mile from starting point set the section corner stone. From this point run a random line to the east boundary and correct back on a true line setting quarter section corners midway between the section corners. Random lines are always run parallel with the established south boundaries of the section to which they belong.

From the corner of sections 1, 2, 11, 12, the line is projected northward, on a random line parallel to the east boundary, setting a temporary corner at forty chains, to the north boundary of the township. If the random line missed the corner of section 1, correct back on the true line setting the quarter section on the true line but leaving it forty chains from the corner of 1, 2, 11, 12.

When the north boundary of a section is a base line or a correction, the west line is not run as a random line but is run parallel to the eastern boundary. The next four ranges are run in the same manner.

In dividing the western range of a township, begin at the established eastern corners and project random lines to the western township boundary and establish true return lines. Set quarter section corners forty chains from eastern section boundary.

This system, although not too carefully followed, has been held by Congress ever since its adoption.

### Value of Variety Tests.

In looking over the work done in the past by our various experiment stations, we find that a great deal of attention has been given to the testing of varieties of the various products. The stations have taken up this work because it has long been known that certain varieties will thrive better under certain conditions than under other conditions, and owing to the large number of varieties that are constantly being introduced it becomes impracticable for us as farmers to test all of them and determine which are best for our conditions. The station, however, under concentrated plans, can take up this large number and determine the few that are likely to do well under the average conditions existing throughout the state. Now we can take up the work at this point and by selecting from the best of these few may be able to tell which is best suited for our conditions.

Unfortunately, however, many of us in our endeavors to profit by the stations work, have taken its results as being too conclusive for all conditions and have lost instead of profited by it. Then, of course, we give the station the credit for our failure. An instance of this kind happened under the writer's observation a few years ago after the Mealy wheat had made such a good showing at the Ohio station. The farmers of one county began at once to grow the Mealy wheat, and it so happened that under their conditions it proved a marked success. The farmers of a neighboring county hearing of this and knowing of its high yield at the station, devoted their entire wheat land to this variety. The conditions of soil, however, being different here from that in the other county, their yields were far below those varieties which they had been accustomed to growing. As a result of these failures many of the

farmers were inclined to question whether or not an experiment station was of much practicable benefit to them. Their mistake was not in experimenting with the new variety, but in devoting all their wheat ground to the experiment without having any evidence that it would be as well under their conditions as the wheat they had been sowing.

A wiser plan would have been to have followed that of a noted horticulturist of this state. As a large grower of strawberries he keeps a careful eye upon the work of the station in their testing of varieties, and instead of choosing the one variety giving the best yield, as the farmers mentioned above did, he selects the five having the largest yields and experiments with these on his own grounds. From these five he selects those that have the best adaptability to his conditions.

Since there is this wide variation in the adaptability of plants, especially to soil conditions, it is impossible for the experiment station, on two or three test farms throughout the state, to be able to say just what variety will be best for any particular locality. The way for us to get the greatest benefits from the station's work is to study the methods pursued by it in sorting out the few varieties, and to apply these methods as far as is practicable in determining which of these few are the best for our own localities. We must come to realize the fact that the station can be of service to us only in so far as we co-operate with it. Not only should we select the varieties which are recommended to us but we must also acquaint ourselves with the station's methods of seeding and culture, otherwise our results may be contrary to what they should be. Thus in this testing of varieties it is very important that we become thoroughly acquainted with the working methods of the station if we

expect to derive the best results on our farms.

It might be well in this connection to mention some of the varieties which have been recommended recently by the Ohio station. In Bulletin 140 the following varieties of corn are suggested: Reid's Yellow Dent and Leaming for south of the fortieth parallel; Leaming and Clarage between the fortieth and forty-first; the Clarage and White Cap, Yellow Dent to north of the forty-first, and the Early Huron Dent for extreme northeast corner of the state. In recommending these varieties of corn, the station suggests that it is not so much new varieties that the corn growers of Ohio need as more careful selection and breeding up of old and well tried varieties.

The varieties of wheat as given by Bulletin 165 are: Gypsy, Early Ripe, Nigger, Poole, Mealy, Currell's prolific, Valley, Red Wonder, Democrat and Fulcaster.

Bulletin 138 suggests the following for oats: American Banner, Improved American, Colonel and Clydesdale, all four of which are of the welcome type.

O. J. B. Smith.

### College News

The ten weeks' course in agriculture bids fare to be received with much popularity judging from the great number of promising students heard from by Dean Price.

The O. S. U. purchased a team of Clydsdale gray geldings of Mr. James Gillie, of Ft. Wayne, Ind. The University also bought a pure bred Galloway spayed heifer. She is expected to make a show ring animal by another year.

Prof. J. W. Decker has recently bought a farm on the west side of the Scioto river, about three miles west of Columbus, near the storage dam. He also has a new automobile.

E. F. Mangold, instructor in Dairy Mechanics, has invented a milk pump which can easily be taken apart and cleaned and is therefore perfectly sanitary. This is a piece of machinery that has long been needed and will be received with gratitude by the dairy world if it proves to be as good as it looks.

### Time Schedule of Winter Course—Agriculture

Hour	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
8-9	Crop Production	Farm Mechanics	Crop Production	Farm Mechanics	Crop Production	Farm Mechanics
9-10	Farm Management	Farm Management		Farm Management	Farm Management	Farm Mechanics
10-11	Horticulture or Breeding and Feeding	Horticulture or Breeding and Feeding	Convocation	Horticulture or Breeding and Feeding	Horticulture or Breeding and Feeding	Farm Mechanics
11-12	Soil Fertility	Soil Fertility	Soil Fertility	Soil Fertility	Soil Fertility	Farm Mechanics
1-2	Stock Judging	Stock Judging or Dairying			Stock Judging or Dairying	
2-4	Crop Production	Stock Judging or Dairying	Crop Production	Breeding or Feeding and Horticulture	Stock Judging or Dairying	
4-5	Special Lectures	Special Lectures	Special Lectures	Special Lectures	Special Lectures	



Professor Plumb purchased four Southdown ewes from R. C. Watt, of Cedarville. These are to be used for judging work.

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Members of the judging team made a profitable trip into Green county, on the sixteenth and seventeenth of November, visiting some very famous herds of cattle, swine and sheep.

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#### Alumni Notes

Walter Florence, ex-'05, is located on a stock farm near Plain City.

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George Snyder, '06, B. Sc., (Agr.) is teaching school at Monroeville, Ohio.

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Dr. Frank Rigdon, '04, D. V. M., is government meat inspector at Kansas City.

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H. H. Hamilton, '05, B. Sc. (Agr.), of Glenford, O., is engaged in general farming.

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A. S. Neal, '05, B. Sc. (Agr.), formerly in newspaper business, has purchased a farm in Summit county, where he is now living.

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L. M. Smith, '05, B. Sc. (Agr.), is a nursery inspector in Illinois, under the directorship of S. A. Forbes. Mr. Smith recently purchased a fruit farm in Southern Illinois.

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F. E. Hamilton, '02, B. Sc. (Agr.), who has been teaching agriculture in Berea College, Kentucky, is now on a western trip. He expects to spend a year in Cornell Agricultural College.

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R. C. Doneghue, '06, has completed his work in soil survey in the State of Illinois, and has gone to the University of Missouri, where on December 1, he entered upon his new work as assistant in Agronomy. "Donnie" has many friends at O. S. U. who wish for him great success in his new field of labor.

#### Book Reviews.

"FARM ANIMALS" is the title of a new book by E. V. Wilcox, published by Doubleday, Page & Co., New York.

It takes up the subjects of Horses, Mules, Beef Cattle, Dairy Cows, Pigs, Sheep, Goats and Poultry and treats them in a way which will appeal to the farmer. Not only are the history and the qualities of the more important breeds of each class of live stock reviewed, but the methods of handling, the kinds of feed to be used, the comparative costs of different rations, the more common diseases and their remedies, all are discussed in an interesting, readable and practical manner. The book is of especial value to the busy farmer who must get in a condensed, yet comprehensive form the latest scientific research in the methods of handling and feeding live stock. It is a book of 357 pages with sixty-three full-page illustrations, and an attractive cloth binding. Price, \$2.00.

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The second volume of the Percheron Register, covering registrations for the year 1905, is now ready for distribution. This volume contains 450 pages and is without doubt the most complete book of its kind ever published.

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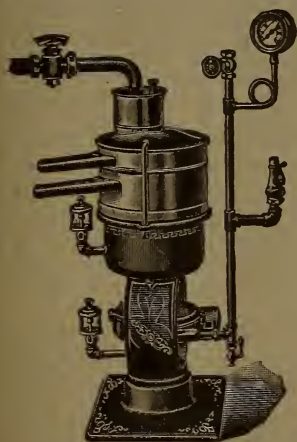
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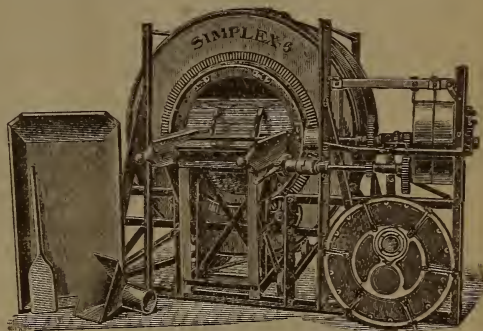
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